Constructing a transport hGIS

Does infrastructure follow infrastructure?

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Constructing a Transport hGIS: Does Infrastructure follow Infrastructure?

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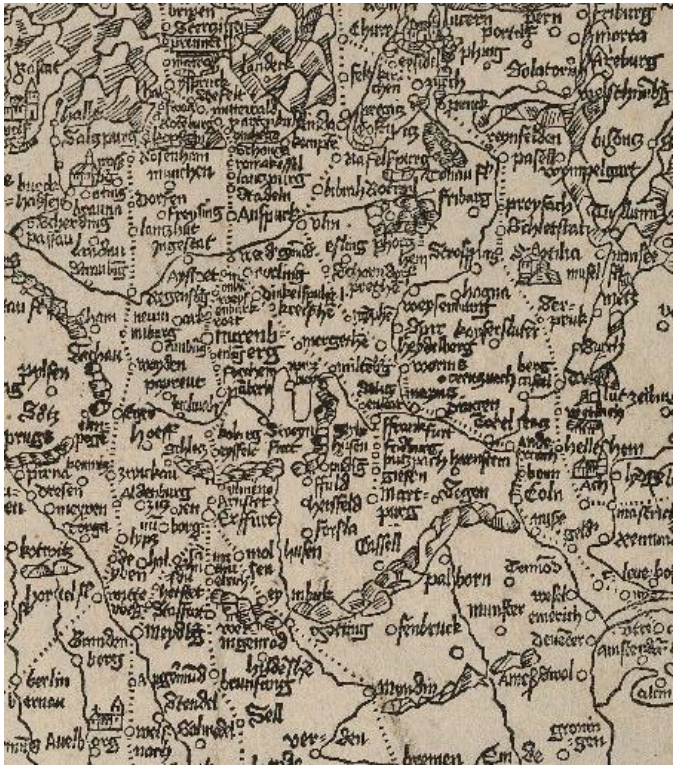
Overview and motivation: Why constructing a hGIS?

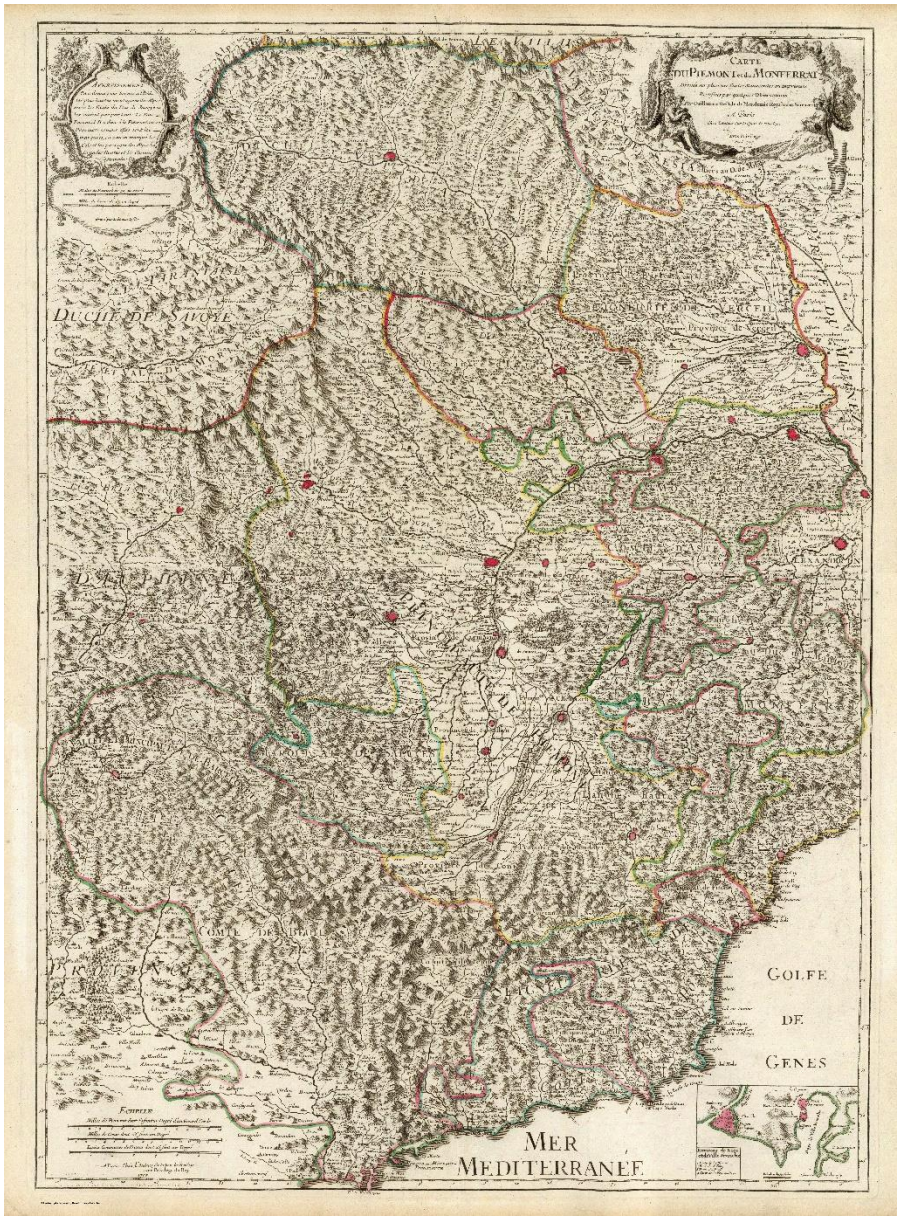
- The role of transport infrastructure in the evolvement of spatial economies and finally national states in Western Europe
- Direct and indirect effect in nation building
  - Direct: State presence – enforcing law, alter citizen's life, …
  - Indirect: Agglomeration effects, urbanisation, productivity
- Accessibility metrics, f(generalised travel costs, population)

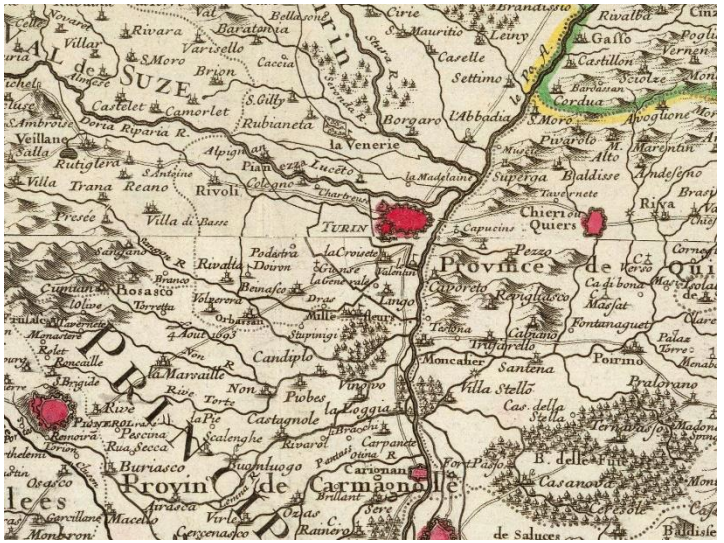
- Physical transport network in Europe 2000 backwards … to 1500 (if possible) in certain time intervals
- Information on network characteristics, transport means, related infrastructure (horse relays, inns etc.)
- Population distribution

Materials for constructing a hGIS



Materials for constructing a hGIS (2)

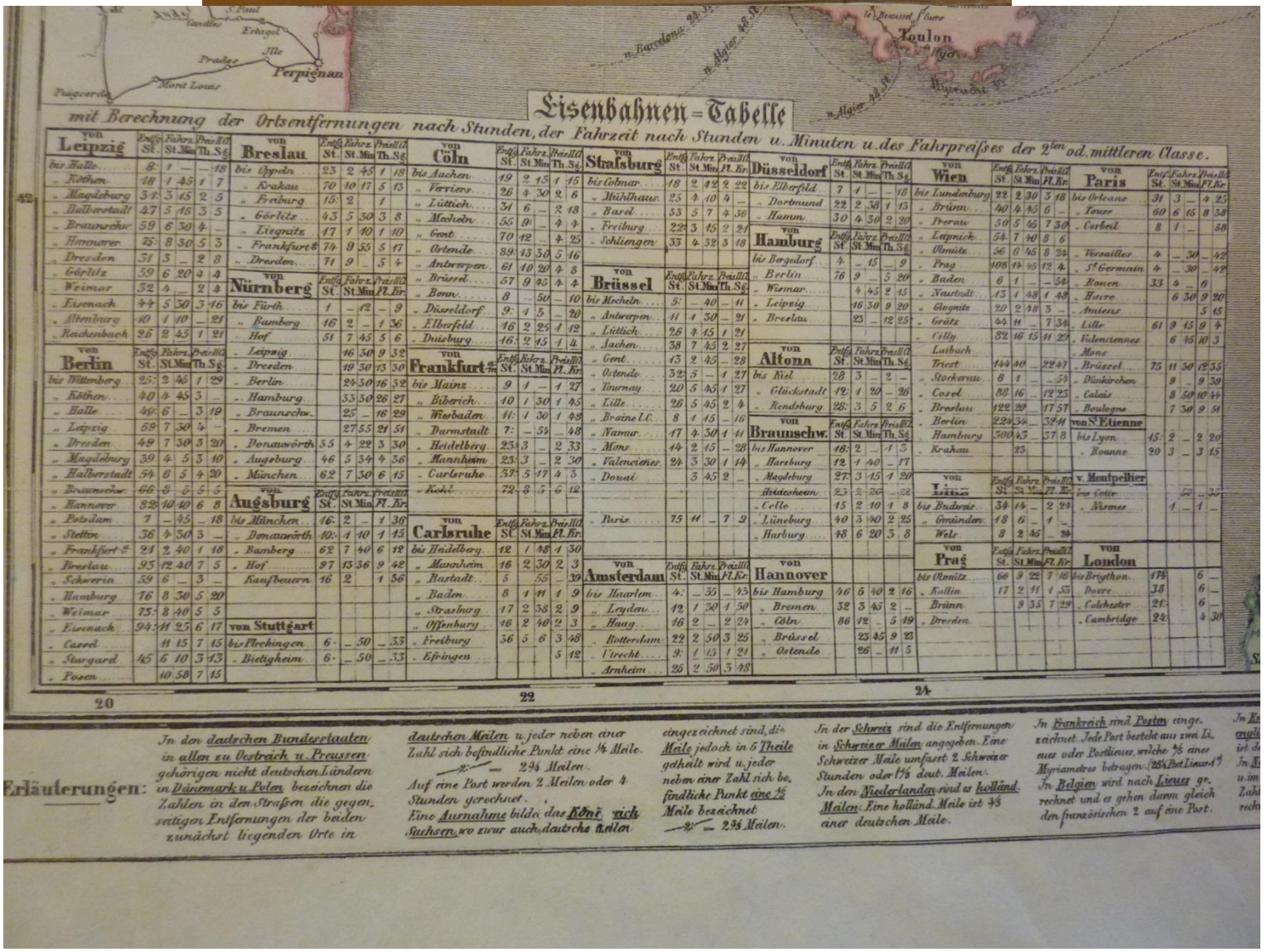




Materials for constructing a hGIS (3)

Materials for constructing a hGIS (4)

Materials for constructing a hGIS (5)

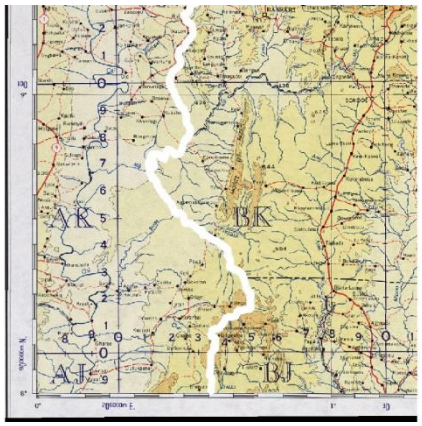


Eisenbahnen-Tabelle

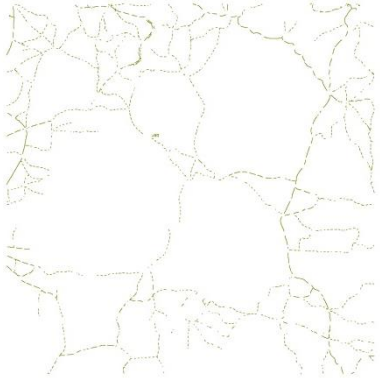
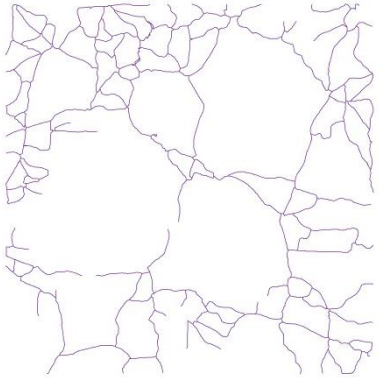
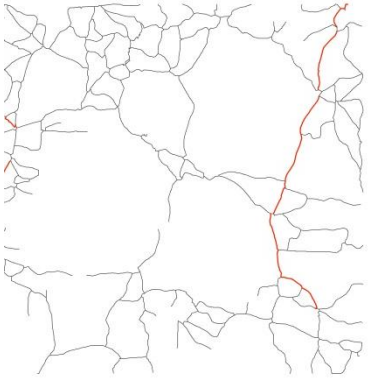
mit Berechnung der Ortsentfernungen nach Stunden, der Fahrzeit nach Stunden u. Minuten u. des Fahrpreises der 2ten od. mittleren Classe.

Erläuterungen:

Semi-automated digitalisation algorithm



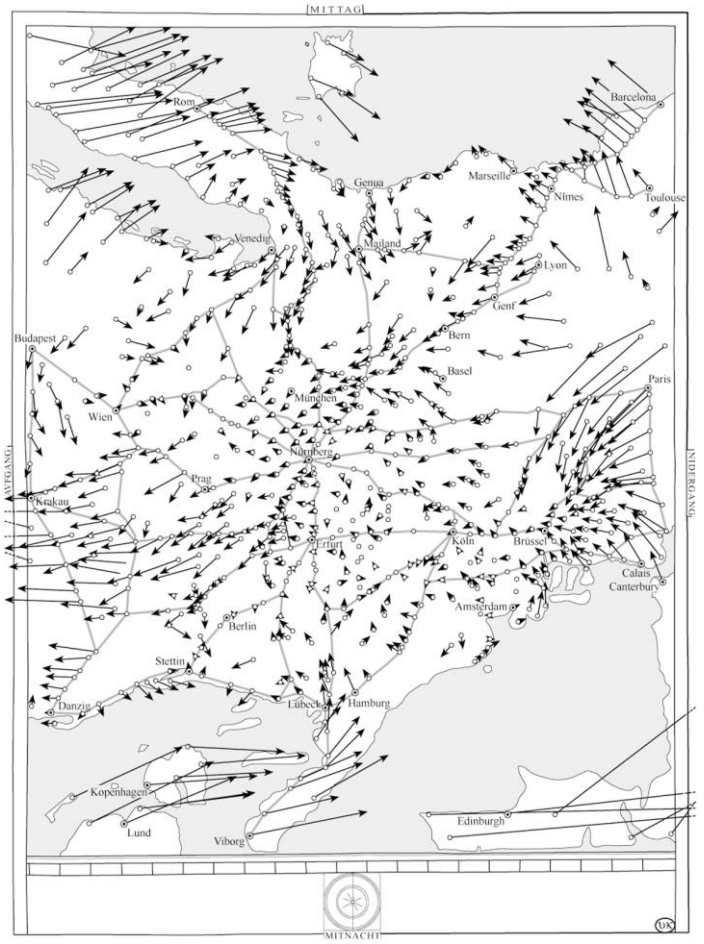


Original – Pre-Treatment – Pixel extraction – Removing circles – Skeletonisation – Vectorisation – Line snapping – Classification

Automated processing of monochrome maps: Problems

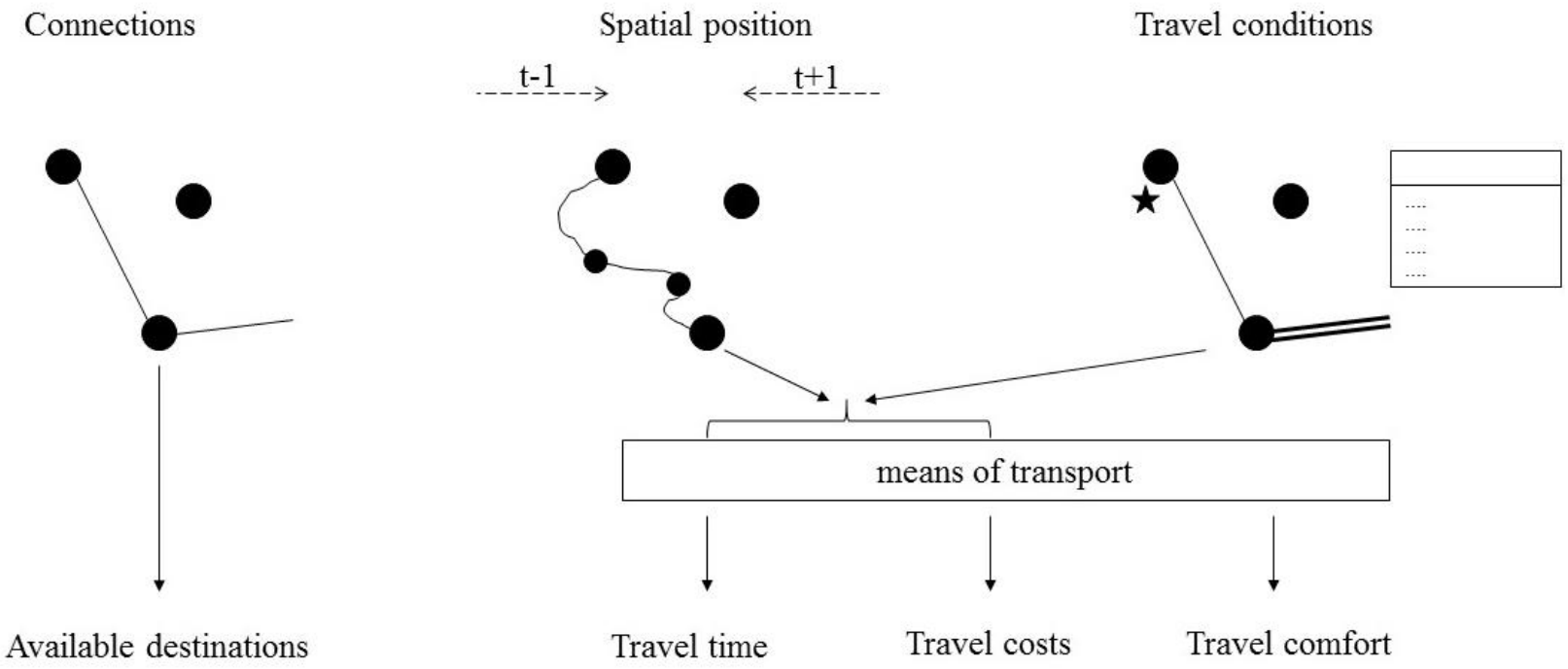
- A black line can be a road, river, coast, letter etc.
- Projection unclear
- Spatial accuracy, precision
- Uniformity: mostly single maps
- Missing meta data
- Mapping style: poor information



➢ Automation is impossible,
and manual work is needed.

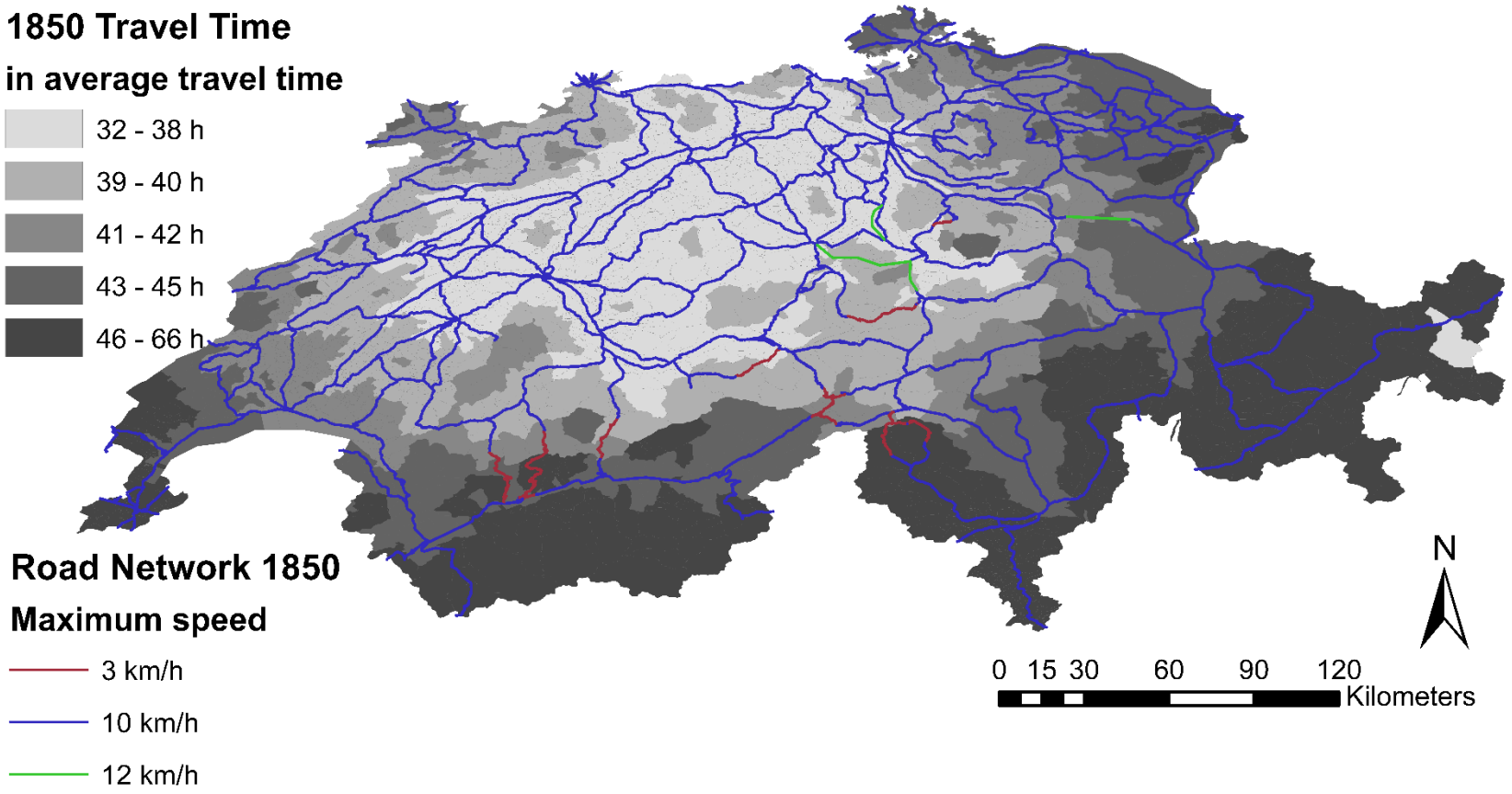
Example: Reconstructing 1850 Switzerland travel times

Structured combination of historical materials

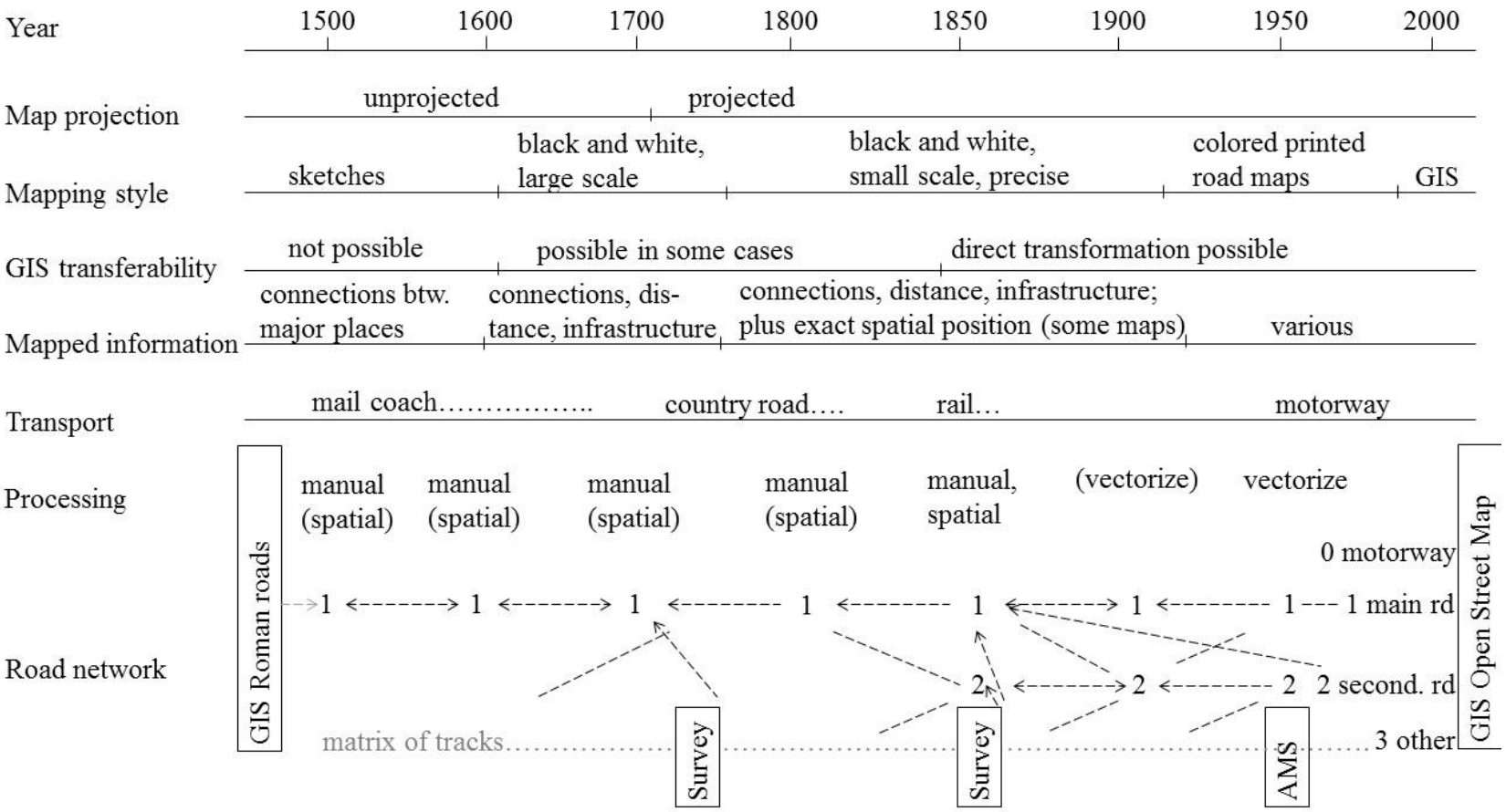


Reconstructing the exact spatial position of a post road

Calculated average travel times



Conclusion: Integral concept for network reconstruction



Infrastructure follows infrastructure

Out of 100% of the 1850 stagecoach road network length (excluding ship routes), which were country roads built until 1850 with horse-related infrastructure,

- roughly 1% became current motorways
- roughly 4% became current hiking trails or alpine paths (“Alpweg”), which are service paths to alpine stables; this transformation mostly occurred with bridle paths over mountain passes
- roughly 89% became current main roads, mostly “Kantonsstrassen” (state/ country roads)
- roughly 6% became secondary or tertiary roads, mostly in urban areas, where former main roads were converted into “city-friendlier” roads